SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-43

Name: Lake Henry **County**: Kingsbury
Legal Description: T110-R56- Sec. 13, 18, 19, 24
Location from nearest town: 4 miles south, 2-1/2 miles east of DeSmet, SD

Dates of present survey: August 2-3, 2010
Date last surveyed: August 6-7, 2008
Management classification: Warmwater Marginal

Managed Species	Other Species
Walleye	Black Crappie
Yellow Perch	Black Bullhead
Northern Pike	White Sucker
Common Carp	Spottail Shiner

PHYSICAL DATA

Surface Area: 2,323 acres **Watershed**: Unknown acres
Maximum depth: 8 feet **Mean depth**: 4 feet
Contour map available: Yes (Shoreline perimeter, GFP) **Date mapped**: 2003
OHWM elevation: None set **Date set**: NA
Outlet elevation: None set **Date set**: NA
Lake elevation observed during the survey: Full
Beneficial use classifications: (6) warmwater marginal fish life propagation, (8) limited contact recreation and (9) wildlife propagation and stock watering.

Ownership of Lake and Adjacent Shoreline Property

Lake Henry was named in honor of George Henry, a pioneer resident of the area. It is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes and the South Dakota Department of Game, Fish and Parks (GFP) manages the fishery. Portions of the shoreline lie within Waterfowl Production Areas owned by the United States Fish and Wildlife Service (USFWS). The remainder of the shoreline is privately owned.

Fishing Access

The Lake Henry Access Area on the south shore of the lake contains a single lane boat ramp, dock, parking lot, and public toilet. Shore fishing is available within the access area and on the public land described above.

Field Observations of Water Quality and Aquatic Vegetation

The water in Lake Henry was fairly clear during the survey. The Secchi depth measurement was 107 cm (42 in). Large beds of sago pondweed were present.

BIOLOGICAL DATA

Methods:

Lake Henry was sampled on August 2-3, 2010 with three overnight gill net sets and five overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting. Sampling locations are displayed in Figure 2.

Results and Discussion:

Gill Net Catch

Walleye comprised 79.3% of the gill net catch this year followed by yellow perch at 9.1% (Table 1). Other species sampled included northern pike, common carp, black bullhead, and black crappie.

Table 1. Total catch from three overnight gill net sets at Lake Henry, Kingsbury County, August 2-3, 2010.

Species	Number	Percent	CPUE[1]	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Walleye	96	79.3	32.0	±9.0	19.5	1	0	86
Yellow Perch	11	9.1	3.7	±1.9	5.2	20	20	116
Northern Pike	10	8.3	3.3	±1.1	4.1	40	0	88
Common Carp	1	1.7	0.7	±0.9	9.9	--	--	--
Black Bullhead	1	0.8	0.3	±0.4	84.9	--	--	--
Black Crappie	1	0.8	0.3	±0.4	0.5	--	--	--

* Four years (2000, 2002, 2004, 2008).

Table 2. Catch per unit effort by length category for various fish species captured with gill nets in Lake Henry August 2-3, 2010.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Walleye	2.0	30.0	29.7	0.3	--	32.0	±9.0
Yellow Perch	0.3	3.3	2.7	--	0.7	3.7	±1.9
Northern Pike	--	3.3	2.0	1.3	--	3.3	±1.1
Common Carp	0.3	0.3	--	--	0.3	0.7	±0.9
Black Bullhead	--	0.3	--	0.3	--	0.3	±0.4
Black Crappie	0.3	--	--	--	--	0.3	±0.4

Length categories can be found in Appendix A.

[1] See Appendix A for definitions of CPUE, PSD, RSD-P and mean Wr.

Trap Net Catch

Common carp made up 62.7% of the trap net followed by northern pike (16%) and walleye (14.7%) (Table 1). Other species sampled included bigmouth buffalo, black bullhead, yellow perch and white sucker.

Table 3. Total catch from five overnight trap net sets at Lake Henry, Kingsbury County August 2-3, 2010.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Common Carp	47	62.7	9.4	±5.9	430.8	96	94	102
Northern Pike	12	16.0	2.4	±1.0	4.8	20	0	90
Walleye	11	14.7	2.2	±0.9	2.0	27	9	85
Bigmouth Buffalo	2	2.7	0.4	±0.3	0.0	--	--	--
Black Bullhead	1	1.3	0.2	±0.3	5.2	--	--	--
Yellow Perch	1	1.3	0.2	±0.3	0.0	--	--	--
White Sucker	1	1.3	0.2	±0.3	0.0	--	--	--

* One year (2008).

Table 4. Catch per unit effort by length category for various fish species captured with trap nets in Lake Henry August 2-3, 2010.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Common Carp	--	9.4	0.4	0.2	8.8	9.4	±5.9
Northern Pike	0.4	2.0	1.6	0.4	--	2.4	±1.0
Walleye	--	2.2	1.6	0.4	0.2	2.2	±0.9
Bigmouth Buffalo	--	0.4	--	0.4	--	0.4	±0.3
Black Bullhead	--	0.2	--	0.2	--	0.2	±0.3
Yellow Perch	--	0.2	--	--	0.2	0.2	±0.3
White Sucker	--	0.2	--	--	0.2	0.2	±0.3

Length categories can be found in Appendix A.

Walleye

Management objective: To maintain a walleye population with a gill-net CPUE of at least 15, 25 cm (10 in) or longer fish in three out of five lake surveys.

Since the last time Lake Henry was stocked with walleye before 2007 was in 1953, the fish sampled before 2007 (Table 5) probably migrated into the lake from Lake Thompson during periods of flooding. Most of the walleyes sampled this year were 29-37 cm (11.4-14.6 in) long and were likely stocked in 2008. A few age-0 walleyes, most likely from the 2010 fry stocking were also sampled.

Yellow Perch

Management objective: To maintain a yellow perch population with a gill-net CPUE of at least 25, 13 cm (5 in) or longer fish in three out of five lake surveys.

Yellow perch abundance is very low with little to no natural recruitment in recent years.

All Species

The overall low abundance of fish in Lake Henry can likely be attributed to several years of low water and partial winterkills. Increased walleye abundance is likely the result of successful stockings from 2007-2010.

Table 5. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in Lake Henry, Kingsbury County, 2002-2010.

Species	2002	2003	2004	2005	2006	2007	2008	2009	2010
SPS (GN)	--		0.3				--		--
SPS (TN)	*		*				--		--
COC (GN)	6.3		14.3				17.3		0.3
COC (TN)	*		*				430.8		9.4
WHS (GN)	0.7		0.3				0.3		--
WHS (TN)	*		*				--		0.2
BLB (GN)	195.0		2.0				0.7		0.3
BLB (TN)	*		*				5.2		0.2
NOP (GN)	7.3		0.7				2.3		3.3
NOP (TN)	*		*				4.8		2.4
BLC (GN)	--		--				--		0.3
BLC (TN)	*		*				--		--
YEP (GN)	8.0		2.7				0.7		3.7
YEP (TN)	*		*				--		0.2
WAE (GN)	29.7		26.3				10.0		32.0
WAE (TN)	*		*				2.0		2.2

* Trap nets were not used 2000-2004 due to low water levels

SPS (Spottail Shiner), COC (Common Carp), WHS (White Sucker), BLB (Black Bullhead), NOP (Northern Pike), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye)

MANAGEMENT RECOMMENDATIONS

1. When water levels are high enough, stock northern pike, yellow perch and walleye following winterkills to maintain some fishing opportunity for anglers and to provide fish for restocking in other waters.

2. Conduct lake surveys every other year to monitor the fishery and provide information to anglers.

Table 6. Stocking record for Lake Henry, Kingsbury County, 1992-2010.

Year	Number	Species	Size
1992	600,000	Northern Pike	Fry
1993	1,000,000	Northern Pike	Fry
2007	2,000,000	Walleye	Fry
2008	2,400,000	Walleye	Fry
2010	2,350,000	Walleye	Fry

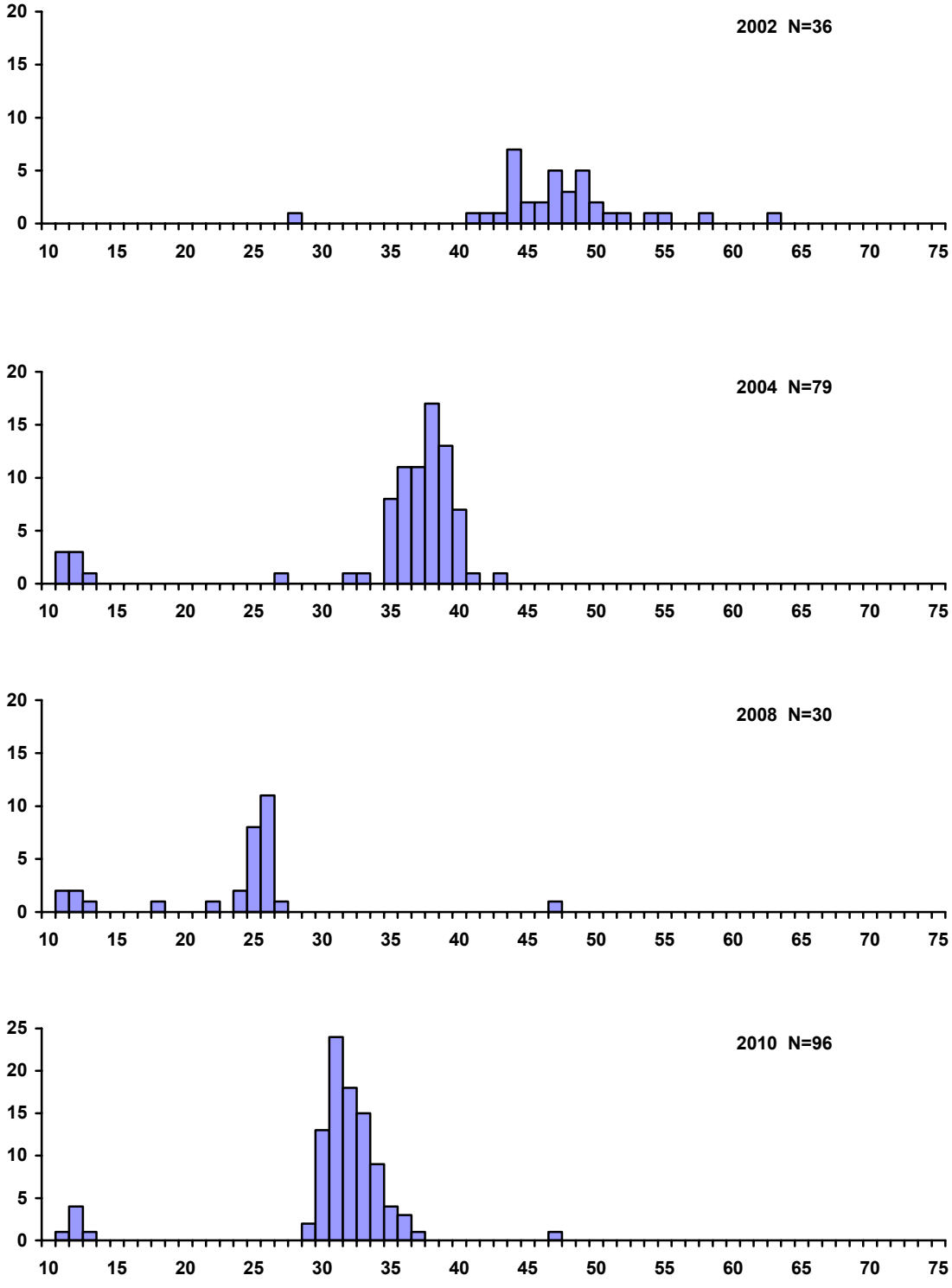
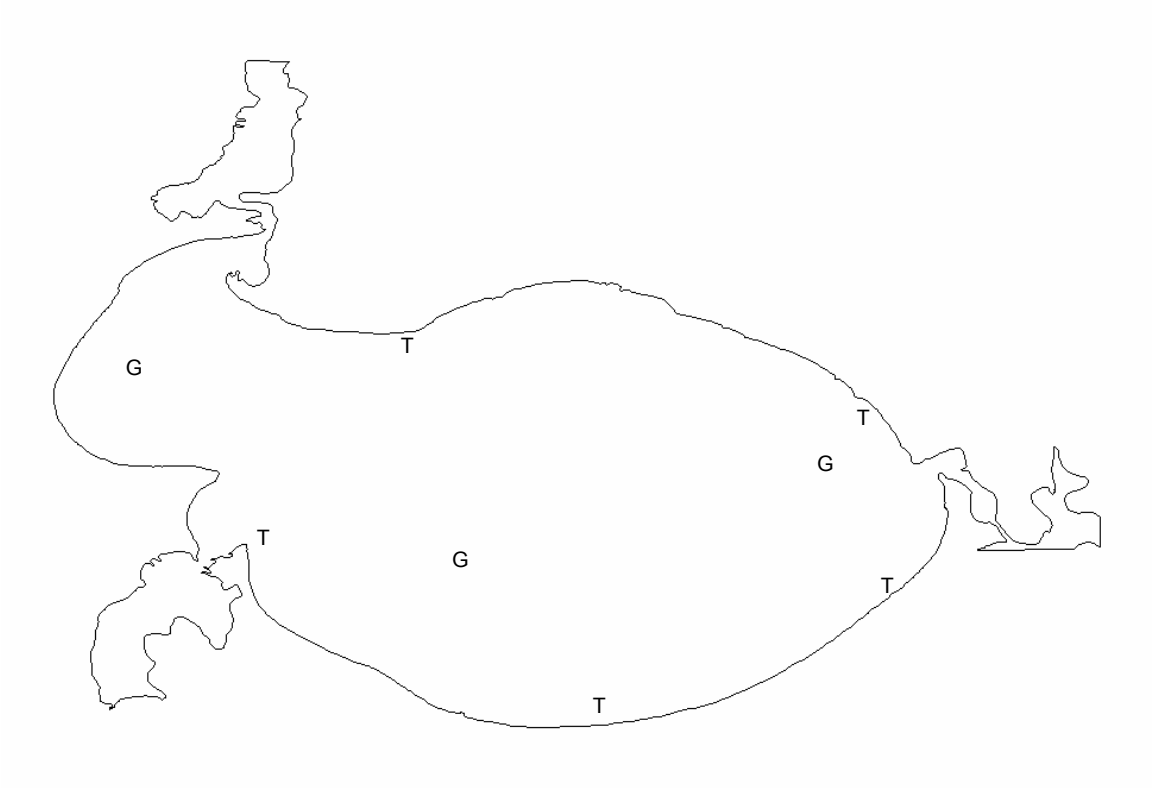


Figure 1. Length frequency histograms for walleyes sampled with gill nets in Lake Henry, Kingsbury County, 2002, 2004, 2008, and 2010.



Legend
Gill Nets: G
Trap Nets: T

Figure 2. Sampling locations on Lake Henry, Kingsbury County, 2010.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.